

ABSTRACT

Processes for rendering a polyamine-epihalohydrin resin storage stable, including processes that prepare a storage stable resin and/or processes that treat resins. A composition containing a polyamine-epihalohydrin resin with a solids content of at least 15 wt% treated with at least one enzymatic agent under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin so that the composition containing the reduced CPD-forming polyamine-epihalohydrin resin when stored for 24 hours at 50°C, and a pH of about 1.0 releases less than about 250 ppm dry basis of CPD for wet strength polyamine-epihalohydrin resin and less than about 100 ppm dry basis of CPD for creping polyamine-epihalohydrin resin. A process for treating polyamine-epihalohydrin resin, to reduce the level of the nitrogen-free organohalogen compound by adding at least one microorganism, or at least one enzyme isolated from the at least one microorganism to an aqueous composition containing a solids content of at least 15 wt%, under conditions to dehalogenate the nitrogen-free organohalogen compound so as to reduce a level of the nitrogen-free organohalogen compound while leaving the polyamine-epihalohydrin resin substantially intact. A process for rendering a polyamine-epihalohydrin resin storage stable by treating the resin of less than 15 wt% with at least one enzymatic agent under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin that when stored for 24 hours at 50°C, and a pH of about 1.0 releases less than about 250 ppm dry basis while simultaneously treating the polyamine-epihalohydrin resin by contacting with at least one microorganism, or at least one enzyme isolated from the at least one microorganism, in an amount, and at a pH and temperature effective to dehalogenate residual quantities of organically bound halogen. A paper product containing the storage stable polyamine-epihalohydrin resin, when corrected for adding at about a 1 wt% addition level of the resin, contains less than about 250 ppb of CPD.